

CROSS REFERENCE TO RELATED APPLICATIONS

5 This application claims the benefit of provisional patent
application 60/141,757, filed June 30, 1999.

TECHNICAL FIELD OF THE INVENTION

This invention relates generally to computer systems, and
10 more particularly to the provision of help information and
features for various software and hardware components of a
computer system.

BACKGROUND OF THE INVENTION

15 As the operating systems, applications, and hardware
components of modern computer systems become increasingly
complicated and offer more features and functions, even an
experienced user would from time to time encounter questions
relating to various aspects of her computer system. Such
20 questions may include, for example, how to use a particular
feature of an application or a hardware device, how to modify
various settings of the system, how to find out what is wrong
when the computer is not performing as expected and how to fix
it, etc. In the early days of the personal computing era,
25 each piece of computer software and hardware by reputable
vendors typically came with one or more user's manuals, most
of them tended to be either too voluminous and difficult for
average users to use, or not comprehensive enough to provide
answers to many questions a user might have. Moreover, many

5 As more computer processing power and system memory
became available, there was a significant improvement in the
way computer help information was provided to the users.
Specifically, help information regarding a software program or
a hardware device may be organized by the vendor of that
10 product into different help topics that a user can access and
view on the computer. For instance, if the user has question
about a function or feature of an application, she can click
on the help option on the menu bar and then try to find the
help topic that provides the information. In addition to
15 selected help topics, an application or device may provide
tours and/or tutorials to teach the user how to use the
features and functions of the product. As the Internet has
become popular and widely accessible, many software and
hardware vendors have also set up online support centers on
20 the World Wide Web, where a user can search for technical
information and obtain online technical support for diagnosis
and troubleshooting. These newer approaches of providing help
information have become so popular that many software and
hardware products nowadays do not even come with old-fashioned
25 paper manuals.

Nevertheless, even with all the help topics and online support available, a user today may still find it a

Often, a question may be of a relatively general nature and could involve several software and hardware components, and

10 provides. Similarly, for a hardware component, the user has to locate and launch the help program for that component and then go through its help topics. If the answer still cannot be found, the user may have to access the various vendor Web sites and go through the information provided there. In doing

time consuming but also can cause significant frustration of the user. The unsatisfactory user experience in finding useful help topics also leads to higher costs of technical support services of the software and hardware vendors, as a user encountering a problem may be more inclined to call for

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Additional features and advantages of the invention will be made apparent from the following detailed description of illustrative embodiments, which proceeds with reference to the accompanying figures.

Figure 1 is a block diagram generally illustrating an exemplary computer system on which the present invention resides;

FIG. 3 is a schematic diagram showing a user interface window provided by a Help Center Application that serves as a single point of entry for accessing help contents for multiple system components;

FIG. 5 is a schematic diagram showing a Compiled HTML file for storing help contents;

25 FIG. 7 is a schematic diagram showing an example of the
contents of a Local Content Store of the embodiment of FIG. 2;

FIG. 8 is a schematic diagram showing an example of a Content Authentication Store of the embodiment of FIG. 2;

FIG. 9 is a schematic diagram showing the an update package for updating the Help Center of FIG. 2; and

5 FIG. 10 is a schematic diagram showing an example of a package description file in the update package of FIG. 9.

DETAILED DESCRIPTION OF THE INVENTION

Turning to the drawings, wherein like reference numerals
10 refer to like elements, the invention is illustrated as being implemented in a suitable computing environment. Although not required, the invention will be described in the general context of computer-executable instructions, such as program modules, being executed by a personal computer. Generally,
15 program modules include routines, programs, objects, components, data structures, etc. that perform particular tasks or implement particular abstract data types. Moreover, those skilled in the art will appreciate that the invention may be practiced with other computer system configurations,
20 including hand-held devices, multi-processor systems, microprocessor based or programmable consumer electronics, network PCs, minicomputers, mainframe computers, and the like.

The invention may also be practiced in distributed computing environments where tasks are performed by remote processing
25 devices that are linked through a communications network. In a distributed computing environment, program modules may be located in both local and remote memory storage devices.

With reference to Fig. 1, an exemplary system for implementing the invention includes a general purpose computing device in the form of a conventional personal computer 20, including a processing unit 21, a system memory 22, and a system bus 23 that couples various system components including the system memory to the processing unit 21. The system bus 23 may be any of several types of bus structures including a memory bus or memory controller, a peripheral bus, and a local bus using any of a variety of bus architectures.

The system memory includes read only memory (ROM) 24 and random access memory (RAM) 25. A basic input/output system (BIOS) 26, containing the basic routines that help to transfer information between elements within the personal computer 20, such as during start-up, is stored in ROM 24. The personal computer 20 further includes a hard disk drive 27 for reading from and writing to a hard disk 60, a magnetic disk drive 28 for reading from or writing to a removable magnetic disk 29, and an optical disk drive 30 for reading from or writing to a removable optical disk 31 such as a CD ROM or other optical media.

The hard disk drive 27, magnetic disk drive 28, and optical disk drive 30 are connected to the system bus 23 by a hard disk drive interface 32, a magnetic disk drive interface 33, and an optical disk drive interface 34, respectively. The drives and their associated computer-readable media provide nonvolatile storage of computer readable instructions, data structures, program modules and other data for the personal

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5 that such acts and operations, which are at times referred to
as being computer-executed, include the manipulation by the
processing unit of the computer of electrical signals

15 However, while the invention is being described in the foregoing context, it is not meant to be limiting as those of skill in the art will appreciate that various of the acts and operation described hereinafter may also be implemented in hardware.

20 Referring now to FIG. 2, the present invention is directed to a framework for providing access to help contents that offers unified organization and presentation of help topics and other types of user-help features, such as trouble shooting and tutorials, etc., to enable a user to get the
25 needed help easily and quickly. A feature of the invention is the provision of a single point of entry (or portal) through which the user can find help contents pertaining to various

By providing all help features through a single point of entry
5 in an organized and coherent way that facilitates easy
navigation, the unified help framework of the invention
eliminates the major cause of user frustration in getting
needed help with conventional systems. The user no longer has
to search for help topics and features that are scattered all
10 over the system and various vendor Web sites and can only be
accessed by launching individual applications or connecting to
individual Web sites.

FIG. 2 shows an embodiment of the unified help framework in accordance with the invention. In this embodiment, the unified help functionality is provided by a Help Center 70. The main architecture of the Help Center 70 is made up by the following components: a Help Center Application 72, a Help Center Database 74, a Help Center Update program 76, a Script Library 78, a Local Content Store 80, a Content Authorization Store 82, and a Support Automation Framework (SAF) Registration Store 84. The functions of each of these components and how they interact to provide the unified help are described in greater detail below.

Turning first to the Help Center Application (HCAApp) 72,
25 this component is the center piece of the architecture of the
Help Center 70 and cooperates with the other components to
provide the unified help functionality. One function of the

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5 As the user goes through the process of locating the help
information, the core area of the window 90 can also be used
to present new user interface information depending on
selections made by the user. For instance, the core area may
be used to display actual help contents or search results if
10 the user selects a help topic or performs a keyword search.
The user interface for self-help problem fix or support
automation for escalating problems to a vendor will also be
displayed in the same core area. In this regard, the author
of support automation help pages is given significant
15 flexibility in deciding what kind of user interface (e.g.,
HTML plus JavaScript, etc.) and how many pages to be
displayed.

In accordance with a feature of the embodiment, the available help topics are organized in a taxonomy structure, which is presented by the HCAApp 72 in its user interface window. The user can navigate through this taxonomy structure to locate relevant help topics. Generally, the taxonomy structure is based on a hierarchical model in which the help topics are categorized into a tree-like structure with multiple layers of categories and sub-categories. For illustration purposes, an exemplary taxonomy structure 110 is shown in FIG. 4, where A1, A2, etc. represent categories and

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The help topics in the taxonomy are the leaf nodes in the tree-like structure. In other words, a help topic does not have child nodes. Each help topic, however, may have multiple parents as shown in FIG. 4. Thus, the same help topic may exist under different taxonomy branches. In a preferred embodiment, in addition to the taxonomy structure, help topics may also be located by using a help topic index or a keyword search. It will be appreciated that not all available help topics have to be mapped into the taxonomy. For example, some help topics that are intended to be located by a keyword search may not quite fit in the taxonomy.

In a preferred embodiment, the help contents are contained in pages in the HTML (Hypertext Markup Language) and may include scripts (e.g., JavaScripts, VBScripts) and objects (e.g., applets, ActiveX/COM). The contents of a help topic
25 may also have links or buttons that can be selected to launch other applications, applets, etc. The help contents stored locally on the computer system are preferably in the form of

Compiled HTML (CHM) Help Files. As shown in FIG. 5, a CHM Help File 116 contains one or more HTML files 120 that provide contents for the associated help topic, a file 122 (referred to as an HHC file) which provides a table of contents for the CHM file, and a file 124 (referred to as an HHK file) that contains an index of the contents. Additionally, as will be described below, a file 144 (FIG. 9) (referred to as an HHT file) that contains "metadata" is used for providing the mapping between the individual help topics and the taxonomy structure. In one implementation, the HHT file 144 is written in the eXtensible Markup Language (XML) and specifies for each help topic in the CHM file the following data: the taxonomy node under which the help topic resides, the URL for the help topic, the title for the help topic, the keywords for help topic, and an optional description of the help topic. The HHT file may also contain an Action field for the help topic to specify whether the contents or mapping of the topic is being added, removed, or updated.

In accordance with a feature of the embodiment, each help topic is associated with a Universal Resource Locator (URL) that can be used to access the contents of that help topic. One important effect of using URLs to access help contents is that there is no distinction between local contents or online contents. Thus, in the case that the URL refers to a local directory, the HCAApp will retrieve the contents of the help topic from that local memory space. On the other hand, if the URL refers to a directory on the Internet, such as a vendor's

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5 In a preferred embodiment, the HCAApp 72 may be launched either by a user or from within an application. To launch the HCAApp, the user may, for example, select the Help menu item from the Start menu. Alternatively, the HCAApp may be launched by an application by calling a proper API of the system.

20 hcp://<content-address>,
 where <content-address> may be any of the following:

	<content-address>	Description
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25	<HTTP URL>	Extracts the contents of the URL and displays them in the browser, no matter where the contents reside.

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C=US/memorystick.htm

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http://system/Taxonomy.htm?path=Security

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For illustration purposes, FIG. 6 shows an exemplary data structure in the form of a table 130 in the HC Database 74 for

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mapping the help topics to the taxonomy. There is one entry for each node in the hierarchy of the taxonomy structure. Each entry contains the following fields: an ID uniquely identifying that node, a parent ID for that node (which is NULL for top-level nodes), the display name of the node, a description (optional) of the node. If the node is a help topic (i.e., a leaf node of the taxonomy), the entry also includes a URL field containing a URL for retrieving the help contents, a keyword field that contains the keywords for identifying this help topic in a keyword search, and an index string for indexing the topic. It will be appreciated that this table in FIG. 6 is shown only as a simple example, and the entry in the database may include other fields relating to the help topic. For instance, such fields may include the type of help (e.g., help information, tutorial, diagnosis, etc.) provided, an identification of the owner of the help contents (i.e., the party that provides the help contents), etc.

In the illustrated embodiment, the various help contents installed on the computer system are all registered in the local content store. The use of the local content store addresses another aspect of security concerns relating to having multiple sources for the help contents stored locally on the computer system. Specifically, one vendor should not be allowed to tamper with the help contents provided by another vendor. As will be described in greater detail below, addition and modification of trusted contents may be by means

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As mentioned above, the help contents for a help topic may be active, i.e., including active components such as scripts. For instance, certain help contents provided by a vendor may provide a fix to a known problem, which may involve the use of scripts to change system settings or modify certain files. Another important and related use of scripts is for support automation, where a user presents (or "escalates") an encountered problem to a support center of the vendor over the Internet. In such a case, the vendor may provide script-based support applications (called "support channels") to collect various system operation information for problem diagnosis and upload such information to the Vendor. Moreover, once the problems are identified, fixes can also be implemented by providing scripts to the computer to perform the corrective actions.

15 Access to the Script Library objects is allowed only if the
URL is found in the Content Authorization Store 82.

As mentioned above, the HCAApp 72 preferably uses the Internet Explorer browser control as the primary mode of viewing the contents of a help topic, which may be active and include scripts. The IE browser control has a built-in security mechanism that will detect unknown or untrusted scripts included in the content pages and provide warnings to the user or refuse to execute such scripts. For active help contents that include scripts, the security mechanism of the IE browser control can be disruptive and may hinder the proper execution of the scripts. To avoid this problem, the trusted active contents that are registered in the Content

5 As mentioned above, one important form of active help
contents is a script-based support application provided by a
vendor for automated support. Before such support
applications can be used, the applications and their vendors
have to be registered with the Support Automation Framework
10 (SAF) Registration Store 84 (FIG. 2). The SAF Registration
Store keeps information for registered vendors and information
specific to the support applications.

One important feature of the unified help framework of the invention is its extensibility. In a preferred embodiment, various help contents can be added to or removed from the computer system, and their taxonomy mapping, index, and search keywords can be changed, by means of an update package. As shown in FIG. 9, in one implementation, the update package 140 is a single cabinet (CAB) file that may contain information for updating the HC Database, SAF Registration Store, the Content Store, and the local file system. For security reasons, the CAB file is preferably signed. The CAB file may have compressed therein a package description file 142, one or more HHT files 144, SAF Config files 146, and update contents 148. All of these components in the package except the Package description file are optional. The package description file 142, which is an XML

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5 description file 142 is shown in FIG. 10. The HHT file 144,
as described above, provides the mapping between the topics in
the update contents 148 (if any) and the taxonomy. The SAF
Config file 146 is used for registering with or removing from
the SAF registration store a vendor connection through which
10 active help contents may be accessed. The content portion of
the update file contains CHM files as described above, HTML
pages, or other things that are to be copied to the local file
system. Contents that are copied to the local file system for
use under the hcp:// namespace are stored on a per vendor
15 basis under the main Help Center directory.

When the Help Center (HC) Update program 76 receives the update package 140, it first verifies that the package is signed by a proper authority to ensure that the package did come from a trusted source, such as a vendor. To this end, the package includes a certificate 150 (FIG. 9) that holds the vendor's name, a public key and other information, all of which are signed by the Certificate Authority using a private key. The HC Update program uses the certificate management APIs of the operating system to verify that the certificate was not tampered with. The certificate management APIs are also used to extract the name and identification data of the vendor from the certificate.

If the contents portion of the package includes data that are
15 identified as TRUSTED_CONTENT in the package description file,
such "trusted contents" are used to update the Contents Store.

In view of the many possible embodiments to which the principles of this invention may be applied, it should be recognized that the embodiment described herein with respect to the drawing figures is meant to be illustrative only and should not be taken as limiting the scope of invention. For example, those of skill in the art will recognize that the elements of the illustrated embodiment shown in software may be implemented in hardware and vice versa or that the illustrated embodiment can be modified in arrangement and detail without departing from the spirit of the invention. Therefore, the invention as described herein contemplates all

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